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SOUTHERN FOREST EXPERIMENT STATION

E. L. Demmon, Director

New Orleans, La.

SAWMILLS IN THE LOWER SOUTH

A Progress Report

By

THE SOUTHERN FOREST SURVEY

I. F. Eldredge

Regional Survey Director

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EXPERIMENT STATION

FOREWORD

The nation-wide Forest Survey, being made by the United States Forest Service, was authorized by the McSweeney-McNary Forest Research Act of 1928. Its five-fold object is: (1) to make an inventory of the present supply of timber and other forest products, (2) to ascertain the rate at which this supply is being increased through growth, (3) to determine the rate at which this supply is being diminished through industrial and local use, windfall, fire, and disease, (4) to determine the present requirement and the probable future trend in the requirement for timber and other forest products, and (5) to correlate these findings with existing and anticipated economic conditions, in order that policies can be formulated for the effective use of land suitable for forest production.

In the South, the Forest Survey functions as an activity of the Southern Forest Experiment Station with headquarters at New Orleans, La.

This release contains Forest Survey data that will be included in more complete reports to be published later. This publication, therefore, is to be regarded as a preliminary progress report, the data in which are subject to correction or amplification as the work of computation proceeds.

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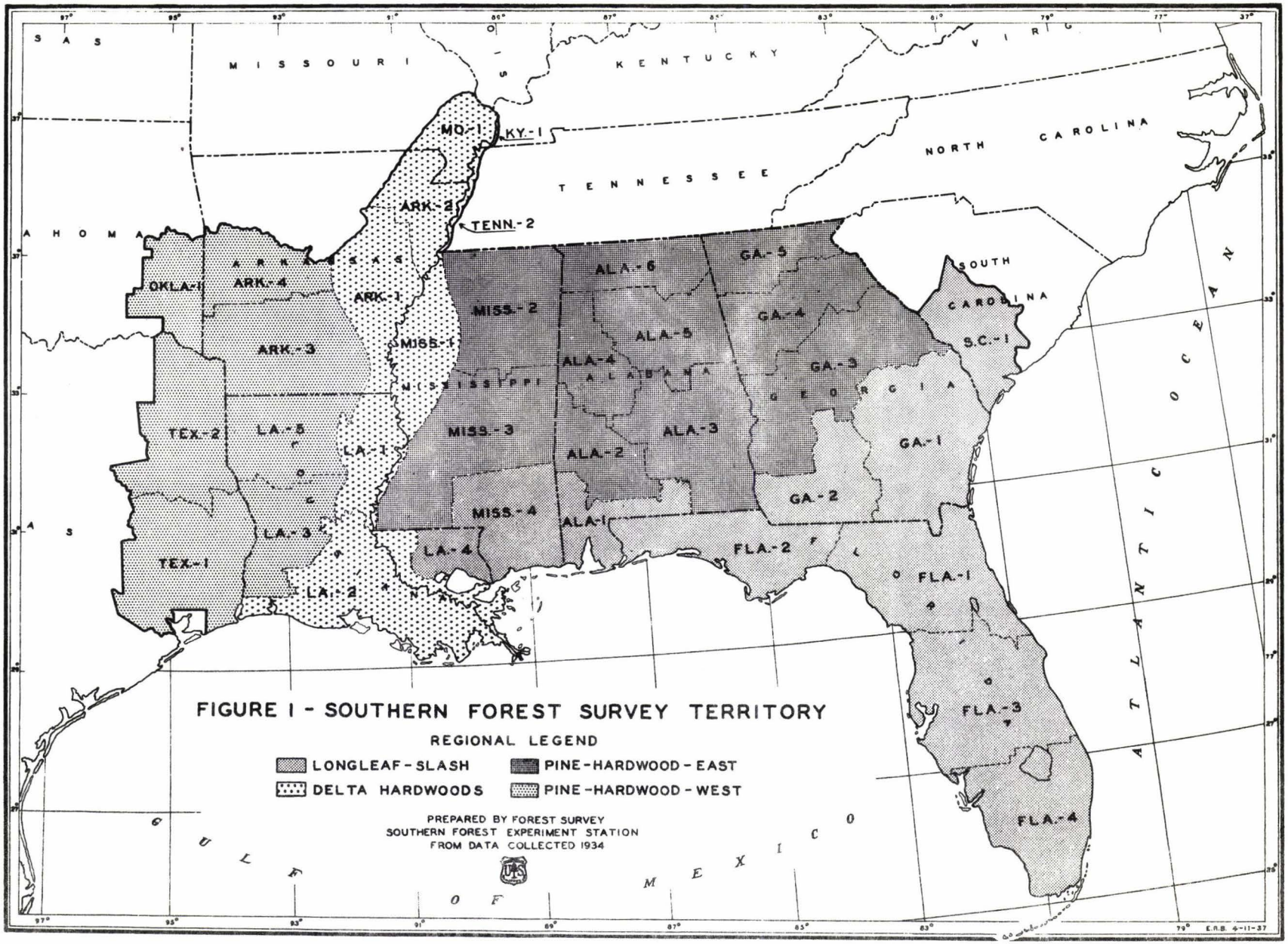


FIGURE 1 - SOUTHERN FOREST SURVEY TERRITORY

REGIONAL LEGEND

LONGLEAF - SLASH

PINE - HARDWOOD - EAST

DELTA HARDWOODS

PINE - HARDWOOD - WEST

PREPARED BY FOREST SURVEY
SOUTHERN FOREST EXPERIMENT STATION
FROM DATA COLLECTED 1934

E.R.B. 4-11-37

SAWMILLS IN THE LOWER SOUTH

In the area covered by the Forest Survey in the lower South, the manufacture of lumber ranks first among the forest industries. Furthermore, present indications are that sawmilling will continue to be the major forest industry in the South even with the increase in the manufacture and use of other forest products, such as pulp, paper, cellulose, and plywood. The region covered in the Survey embraces the Gulf States, Georgia, and parts of South Carolina, Arkansas, Tennessee, and Missouri. The major forest regions and the survey units into which this section of the country has been divided are shown on the map. The longleaf-slash pine region, which is the seat of the naval-stores industry, is characterized by forests of longleaf and slash pine, with a varying admixture of hardwoods, cypress, and loblolly and other pines. In the two pine-hardwood regions the forests are chiefly loblolly and shortleaf pines with a considerable volume of hardwoods, although in parts of southeastern Texas and southwestern Louisiana longleaf pine is also important from a production standpoint. The forests of the Mississippi River Delta region are made up almost entirely of hardwoods.

The Lumber Industry

Lumbering, as an industry of the South, began in the early days, but until about 1875, except along the Atlantic Coast where an export trade had long existed, the forests were logged mainly for local consumption. In the late 80's the progressive exhaustion of northern timber supplies turned the larger-mill industry southward, and for the next 40 years great areas of virgin forest, particularly pine, throughout the South were bought up in tracts and subjected to rapid, large-scale exploitation. Similar liquidation of the hardwood forests of the lower South did not begin as early or progress so rapidly.

As the larger pine operators, particularly those that logged their holdings less intensively, relinquished certain regions, small mills began to appear; and as the residual stands were bolstered up with second growth, the number and production of these plants increased. In the bottomland-hardwood regions, the large mills are followed more often by the manufacture of slack staves, handle stock, crossties, and other nonlumber commodities than by small sawmills.

The data on sawmills used as the basis of this release were collected by the Forest Survey in 1934 and 1935. The reports of the several Lumber Code agencies as to the number, location, and character of sawmills in the region were used as the point of departure in making the study. All of the large mills and approximately 50 percent of the medium-sized mills were then visited by investigators with a questionnaire. Because of the great number of small mills, it was possible to sample only about 10 percent of them. Although this sampling was designed to cover all parts of the region and all classes of conditions, the relative accuracy of the findings is greater for the larger mills than for the smaller ones.

Type of Sawmills

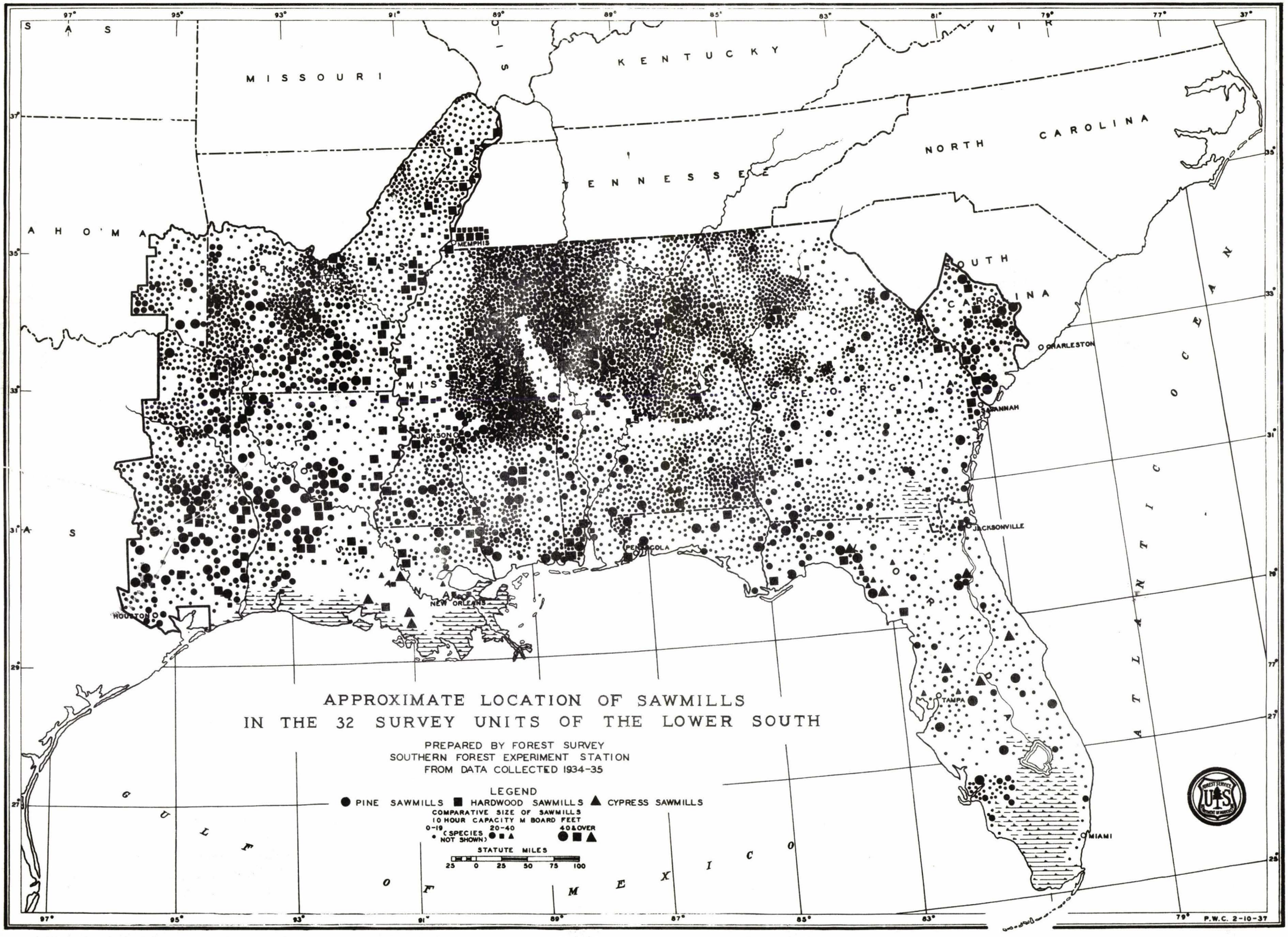
In 1934-35 there were in the entire area over 8,000 sawmills of all sizes, both portable and stationary. They ranged in size from the smallest, producing a few thousand board feet per annum for local use, to the largest, cutting as much as 80 million board feet a year. The total number of sawmills shown on the map (fig. 2) is listed in table 1 by survey units in the four forest regions, which are further classified according to size and species cut. The three major species-groups into which the mills are classified on this latter basis are pine, hardwood, and cypress. All mills cutting at least 50 percent of their volume from pine species in 1934 are classified as pine mills. Similarly, to be classified as a cypress mill, a mill must cut at least 50 percent of its production in cypress lumber. Hardwood mills, on the other hand, are those that cut more than 50 percent of their total production from hardwood species. In many cases, mills manufacturing either pine, hardwood, or cypress at the time of the survey might later change to some other species.

All mills listed as having a daily capacity of 40M board feet or more are stationary mills, set up on a more or less stable basis of operation. Pine mills of 20 to 39M board feet capacity are generally kept on one location for a long time, but some of them are frequently moved. In the Delta region, hardwood mills of this size are usually stationary. Most mills of a daily capacity of 19M board feet and under are easily moved and may be considered as portable. A considerable number of this group, however, particularly among the smallest mills, are actually fixed mills, since they are operated for strictly local needs from the surplus power of cotton gins, grist mills, etc.

Table 1 gives the number of mills of the several size- and species-classes for each of the four forest regions of the lower South. Of the pine mills, 1 percent has a capacity of at least 80M board feet per day, 1 percent has a daily capacity of 40 to 79M board feet, 6 percent are in the 20 to 39M class, and 92 percent are small mills with a daily capacity less than 20M board feet. Of the hardwood mills, about 1 percent are in the 80M and up class, 6 percent in the 40 to 79M class, 10 percent in the 20 to 39M class, and 83 percent in the class with a daily capacity less than 20M board feet. In the cypress mills, the corresponding figures are 6 percent, 15 percent, 28 percent, and 51 percent, respectively.

Lumber Cut by Mills of the Various Size-Classes

The importance of the small sawmills in the total amount of lumber cut in the lower South has been recognized for many years, particularly during the past two decades, when many of the original large mills discontinued operations. The proportion of the 1934 lumber production cut by mills in the different size groups and in the different regions is shown graphically in figure 3 for the pine and in figure 4 for hardwoods. The small mills (19M and under), comprising 92 percent of all pine mills in the lower South, account for 47 percent of the total production of pine lumber. It is estimated from information procured from operators of small pine mills in Alabama and northwest Louisiana that between 40 and 50 percent of the small-



APPROXIMATE LOCATION OF SAWMILLS IN THE 32 SURVEY UNITS OF THE LOWER SOUTH

PREPARED BY FOREST SURVEY
SOUTHERN FOREST EXPERIMENT STATION
FROM DATA COLLECTED 1934-35

LEGEND

● PINE SAWMILLS ■ HARDWOOD SAWMILLS ▲ CYPRESS SAWMILLS

COMPARATIVE SIZE OF SAWMILLS
10 HOUR CAPACITY M BOARD FEET

0-19 (SPECIES NOT SHOWN)	20-40	40 & OVER
•	● ■ ▲	● ■ ▲

STATUTE MILES
25 0 25 50 75 100

P.W.C. 2-10-37

FIGURE 2

Table 1. — Number of sawmills in the Deep South in 1934 (listed by capacity classes and species cut)

Region	State and unit	Species groups and size class of mill (10-hour M.B.F. daily capacity)															Total all mills
		Pine					Hardwood					Cypress					
		80 +	40-79	20-39	1-19	Total	80 +	40-79	20-39	1-19	Total	80 +	40-79	20-39	1-19	Total	
		Number of mills															
Longleaf-Slash Pine	S.C. #1	-	1	6	100	107	2	9	5	24	40	-	-	-	-	-	147
	Ga. 1	-	1	13	259	273	-	1	5	-	6	-	-	-	-	-	279
	Ga. 2	-	1	10	136	147	-	-	1	-	1	-	-	-	-	-	148
	Fla. 1	3	-	8	118	129	1	1	3	2	7	3	-	5	6	14	150
	Fla. 2	4	4	17	146	171	-	3	1	8	12	-	-	-	-	-	183
	Fla. 3	1	5	13	167	186	-	-	1	1	2	-	3	2	4	9	197
	Ala. 1	1	5	8	128	142	-	3	3	1	7	-	-	-	-	-	149
	Miss. 4	7	2	15	197	221	-	2	-	10	12	-	-	-	-	-	233
	La. 4	2	1	3	33	39	1	1	2	7	11	-	-	-	-	-	50
	Total	18	20	93	1,284	1,415	4	20	21	53	98	3	3	7	10	23	1,536
Percent by species group		1.3	1.4	6.6	90.7	100.0	4.1	20.4	21.4	54.1	100.0	13.0	13.0	30.5	43.5	100.0	-
Pine-Hardwood (East)	Ga. #3	-	4	12	495	511	-	3	5	15	23	-	-	-	-	-	534
	Ga. 4	-	-	2	307	309	-	1	2	2	5	-	-	-	-	-	314
	Ga. 5	-	-	2	211	213	-	-	-	2	2	-	-	-	-	-	215
	Ala. 2	1	3	10	102	116	-	-	3	11	14	-	-	-	-	-	130
	Ala. 3	1	10	27	495	533	-	-	9	16	25	-	-	-	-	-	558
	Ala. 4	2	-	25	142	169	-	-	1	17	18	-	-	-	-	-	187
	Ala. 5	-	1	22	512	535	-	-	1	10	11	-	-	-	-	-	546
	Ala. 6	-	-	-	199	199	-	-	1	94	95	-	-	-	-	-	294
	Miss. 2	-	1	13	802	816	-	1	7	199	207	-	-	-	-	-	1,023
	Miss. 3	8	1	44	505	560	-	3	21	77	101	-	-	-	-	-	661
	Total	12	22	157	3,770	3,961	-	8	50	443	501	-	-	-	-	-	4,462
Percent by species group		.3	.6	4.0	95.1	100.0	-	1.6	10.0	88.4	100.0	-	-	-	-	-	-
Delta Hardwood	La. #1	-	-	-	-	-	-	9	5	26	40	-	-	-	-	-	40
	La. 2	-	-	-	-	-	-	9	8	32	49	-	4	4	10	18	67
	Miss. 1	-	-	-	-	-	1	3	9	85	98	-	-	-	-	-	98
	Ark. 1	-	-	-	-	-	-	8	9	141	158	-	-	-	-	-	158
	Ark. 2	-	-	-	-	-	-	5	7	134	146	-	-	1	4	5	151
	Tenn. 2	-	-	-	-	-	-	-	-	7	7	-	-	-	-	-	7
	Ky. 1	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	1
	Mo. 1	-	-	-	-	-	-	-	2	78	80	-	-	1	-	1	81
	Total	-	-	-	-	-	1	34	41	503	579	-	4	6	14	24	603
Percent by species group		-	-	-	-	-	.1	5.9	7.1	86.9	100.0	-	16.7	25.0	58.3	100.0	-
Pine-Hardwood (West)	La. #3	17	2	13	59	91	3	5	2	11	21	-	-	-	-	-	112
	La. 5	1	5	20	77	103	-	3	4	8	15	-	-	-	-	-	118
	Ark. 3	9	2	46	354	411	-	4	4	32	40	-	-	-	-	-	451
	Ark. 4	2	-	24	177	203	-	-	-	23	23	-	-	-	-	-	226
	Tex. 1	13	9	26	101	149	2	5	8	11	26	-	-	-	-	-	175
	Tex. 2	2	5	24	255	286	-	1	3	32	36	-	-	-	-	-	322
	Okla. 1	2	1	10	81	94	-	-	2	11	13	-	-	-	-	-	107
	Total	46	24	163	1,104	1,337	5	18	23	128	174	-	-	-	-	-	1,511
Percent by species group		3.4	1.8	12.2	82.6	100.0	2.9	10.3	13.2	73.6	100.0	-	-	-	-	-	-
Grand total number of mills		76	66	413	6,158	6,713	10	80	135	1,127	1,352	3	7	13	24	47	8,112
Percent by species group		1.1	1.0	6.2	91.7	100.0	.8	5.9	10.0	83.3	100.0	6.4	14.9	27.6	51.1	100.0	-

mill pine production was cut by mills that moved at least once during 1933-1935. The large mills (40M and over), which comprise only 2 percent of the number of mills, cut 36 percent of the pine lumber. The mills in the intermediate class (20-39M) make up 6 percent of the total number of mills and account for the remaining 17 percent of the pine-lumber production. Both the absolute amount cut by small mills and also the proportion of the total cut are increasing. Although the large mills cut a little more than a third of all pine lumber, the value of their production is considerably greater than a third of the total value of pine lumber produced, because the timber cut in these mills is of a higher quality and because the material is marketed to better advantage.

Of the hardwood cut in the region, 47 percent is produced by large mills, 31 percent by the medium-sized mills, and 23 percent by small mills.

At the present time, the cypress mills are located chiefly in Florida and southern Louisiana. Sixty-eight percent of the cypress production in the longleaf-slash pine region is cut by large mills, 17 percent by medium-sized, and 15 percent by the small mills.

Sawmill Equipment

The equipment of the sawmills in the lower South varies from the completely equipped band mill, containing a resaw, gang saw, dry kiln, planer, and accessory equipment, to the portable mill with only a circular saw. Of the total number of mills, 68 percent are circular mills and 32 percent are band mills (fig. 5). Almost three-fourths of the circular mills are small (19M and under) and only 5 percent are large (40M and over).

Of the band mills, only 3 percent are small. Also it has been found that 62 percent of all mills have planers, 44 percent have dry kilns, 16 percent have resaws, and 5 percent have gang saws. Only 2 percent of all mills are completely equipped. Most of the gang saws and resaws are in the larger band mills, but planers are generally well distributed among mills of all sizes. It is estimated that over one-third of all mills (usually among the small mills) have only headsaws, with or without some accessory equipment, such as cut-off saws and edgers.

Small portable mills can be set up to cut from several thousand to several million board feet of timber at a "set", and can be operated economically from a few weeks in a season to a full working year, the length of which is determined by the weather. They cut any quality and size of timber, but usually operate on small logs and in second-growth timber. This type of mill usually does not accumulate large inventories but operates on a "hand-to-mouth" basis. Generally, throughout the pine regions, the pine lumber sawed by these mills is seasoned and surfaced at concentration yards or nearby planing mills. These yards can handle the rough lumber produced by a number of mills, and the equipment usually consists of dry kilns, planers, and adequate storage and shipping facilities. It is through these concentration yards that large quantities of pine lumber are dressed and marketed.

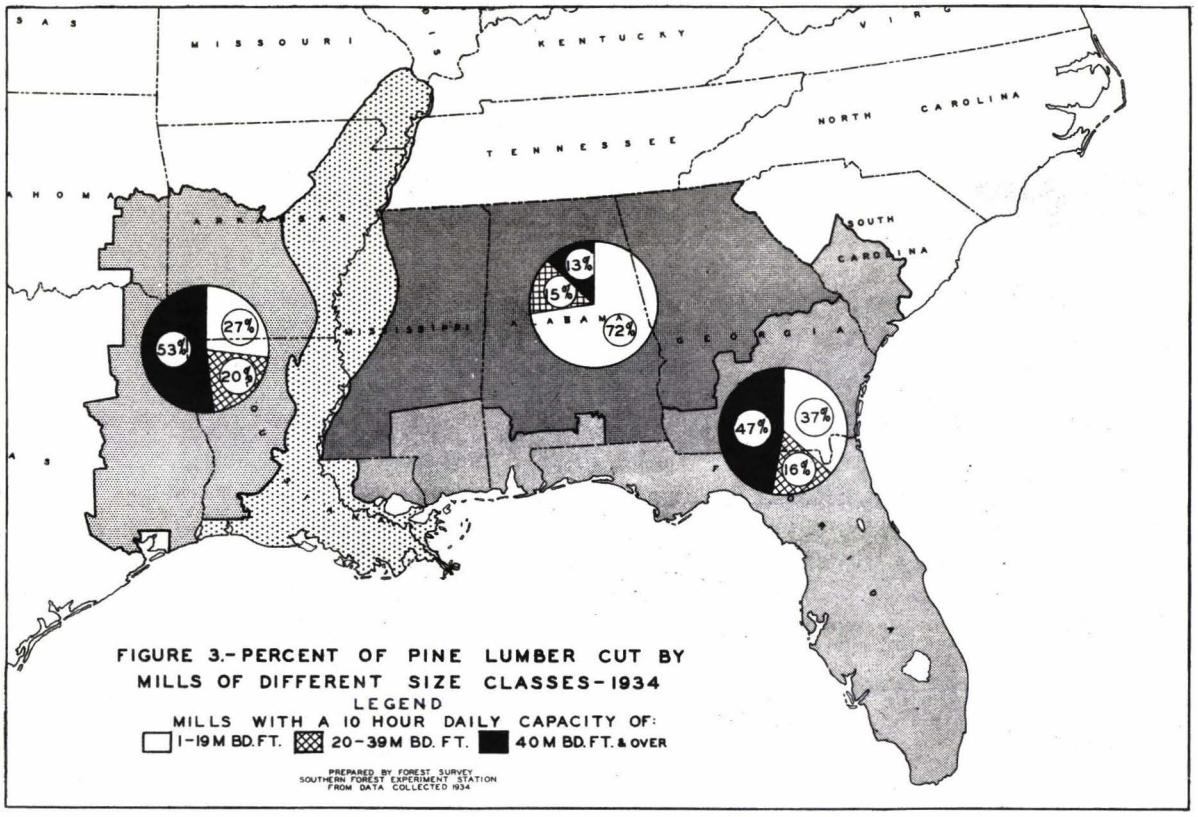


FIGURE 3.- PERCENT OF PINE LUMBER CUT BY MILLS OF DIFFERENT SIZE CLASSES - 1934

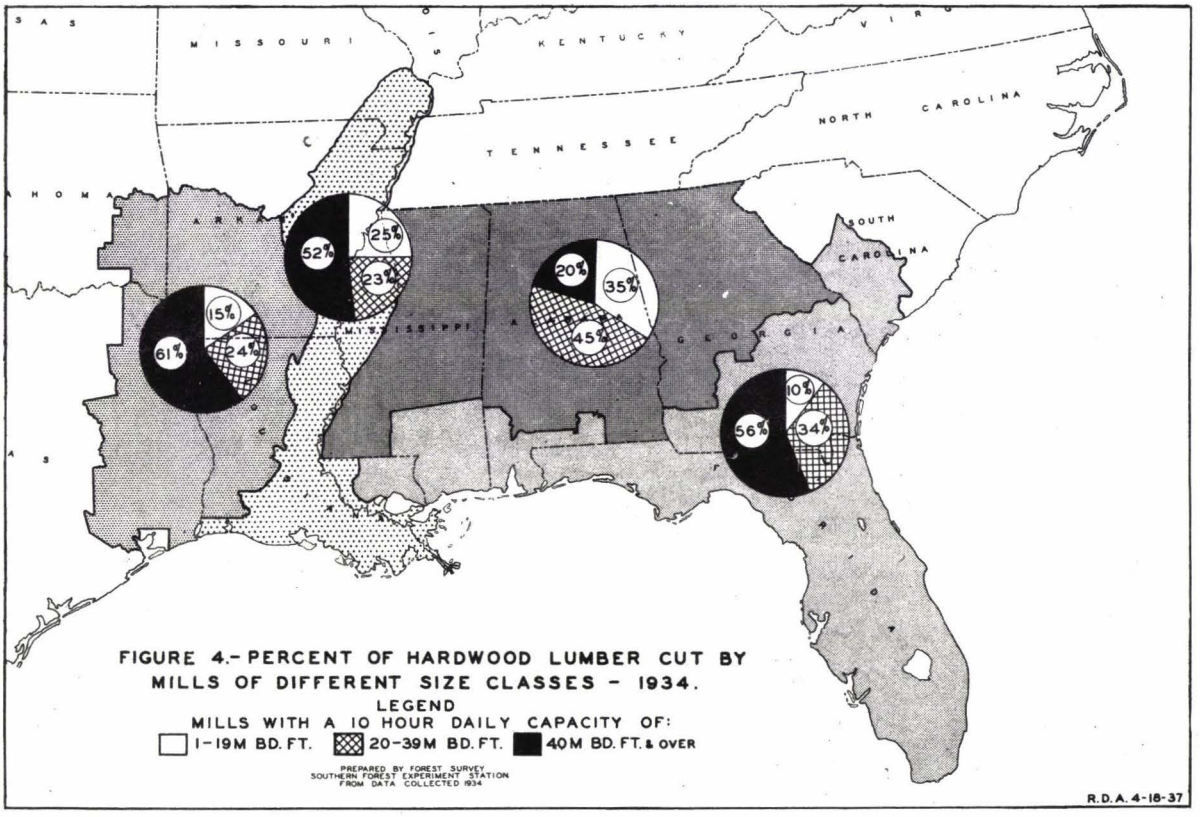
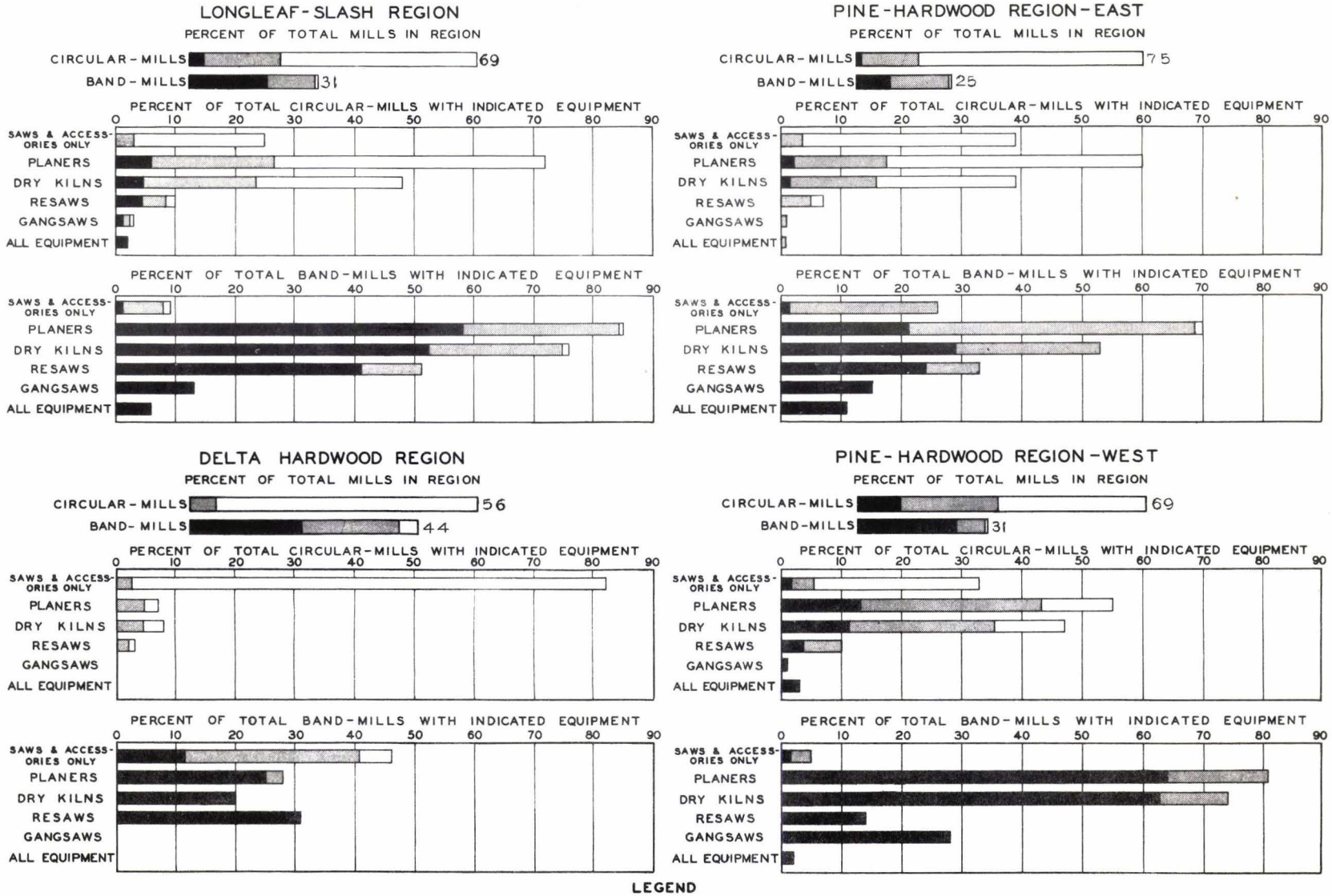


FIGURE 4.- PERCENT OF HARDWOOD LUMBER CUT BY MILLS OF DIFFERENT SIZE CLASSES - 1934.

FIGURE 5 - PRINCIPAL ITEMS OF SAWMILL EQUIPMENT USED



The combination of portable mill and concentration yard represents a growing development in the manufacture and marketing of pine lumber. In the production of hardwood lumber, however, this combination will probably not become an important part of the industry, owing to the fact that rough, air-dried lumber is usually shipped for kiln-drying and fabrication directly from the mill to consumers in all parts of the country.

Also the concentration yard is associated chiefly with the small mills. In the lower South there are over 1,000 of these yards, not including large sawmills which act in this capacity while handling the output of the portable mills. Most of these yards (over 80 percent), as might be expected, are located in the pine-hardwood region (east), which is the area with the greatest number of small mills. The remaining 20 percent are divided between the longleaf-slash pine region and the pine-hardwood region (west). The small mills located in these latter regions cater more to local trade, and most of their product is used in the immediate vicinity.

Logging Methods

Bunching

Logging operations in the lower South consist generally of two separate phases: the bunching or yarding in the woods, and the final transportation to the mill. Over 67 percent of all the sawmills in this area are using only animals for bunching, either skidding the logs or hauling them with high wheels or wagons. An additional 23 percent use animals in combination with tractors, gas or steam skidders, and similar equipment. Most of the mills use mules, but 12 percent are using oxen.

Gas skidders are the principal means used by 15 percent of the mills (mainly in the regions east of the Mississippi); while 10 percent use tractors, 6 percent use steam skidders, and 1 percent use pull-boats as their chief bunching equipment.

Figure 6 shows graphically in each region the percentage of the mills using specific types or combinations of equipment. Each bar represents the percentage of all mills in the region using a given type, and this bar is further subdivided to show the proportion of the mills in each of the three size-classes.

Transportation to the mill

In the transportation of logs from the woods to the log-pond or mill deck, over 60 percent of all the mills in the lower South use trucks alone, while an additional 25 percent use trucks in combination with other equipment. Of the mills using only trucks 24 percent are medium-sized and 6 percent are large.

Logging railroads are used by 11 percent of all mills. Most of the large mills use a combination of trucks and railroads, hauling the logs up to 40 miles by truck and up to 150 miles by common carrier.

Figure 7 shows graphically the percentage of mills in each region using specific types of equipment. Each bar represents the percentage of the mills in the region using equipment of a specific type, and the bar is further subdivided to show the proportion of mills in each size-class.

Labor Requirements

Table 2 shows the average number of man-days of labor required to produce a thousand feet board measure in the log in the woods and a thousand board feet of lumber in the mill, in the four major forest regions and in different types of mills.

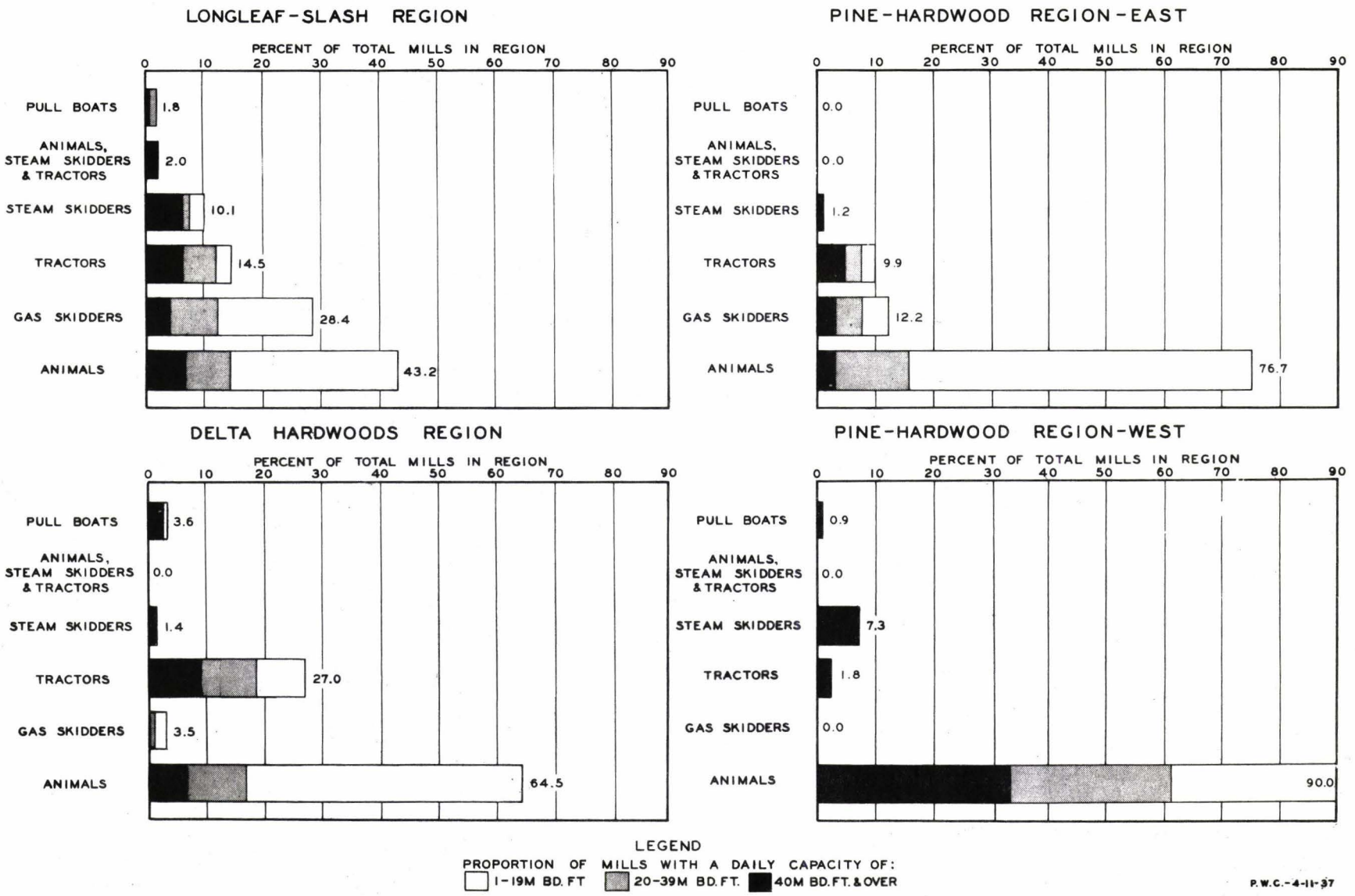
Combined (woods and mill) operations for producing pine lumber require more labor per thousand board feet than do similar operations for hardwood because of the higher degree of finishing done to the former. Cypress operations require more labor than either pine or hardwood because of the greater difficulty in logging. The pine operations in the longleaf-slash region require more labor than in the other regions because of differences in logging and manufacturing conditions. The hardwood operations of the pine-hardwood region (west) require the smallest amount of labor per thousand board feet.

Table 2. - Average labor required to produce one thousand board feet of lumber

Region	Woods			Mill			Combined Woods & Mill		
	Pine	Hdwd.	Cypress	Pine	Hdwd.	Cypress	Pine	Hdwd.	Cypress
	Number of men working 10 hrs.								
Longleaf-Slash	1.29	1.21	1.50	2.28	1.44	2.25	3.57	2.65	3.75
Pine-Hardwood-East	1.16	1.40	-	1.87	1.62	-	3.03	3.02	-
Pine-Hardwood-West	1.06	1.05	-	1.72	1.42	-	2.78	2.47	-
Delta Hardwoods	-	1.02	-	-	1.54	-	-	2.56	-

Figure 8 shows the average labor requirements in mills of various sizes. Labor requirements apparently increase in both logging and milling as the mill increases in size, except for the very largest mills. These variations in labor requirements, as is well-known, are due to variations in (1) type of logging, (2) proximity to the timber, (3) kind of product manufactured, and (4) amount of machinery used.

FIGURE 6.-PRINCIPAL KINDS OF MOTIVE POWER USED IN BUNCHING LOGS


LONGLEAF-SLASH REGION
PERCENT OF TOTAL MILLS IN REGION
0 10 20 30 40 50 60 70 80 90
PULL BOATS 1.8
ANIMALS, STEAM SKIDDERS & TRACTORS 2.0
STEAM SKIDDERS 10.1
TRACTORS 14.5
GAS SKIDDERS 28.4
ANIMALS 43.2
PINE-HARDWOOD REGION-EAST
PERCENT OF TOTAL MILLS IN REGION
0 10 20 30 40 50 60 70 80 90
PULL BOATS 0.0
ANIMALS, STEAM SKIDDERS & TRACTORS 0.0
STEAM SKIDDERS 1.2
TRACTORS 9.9
GAS SKIDDERS 12.2
ANIMALS 76.7
DELTA HARDWOODS REGION
PERCENT OF TOTAL MILLS IN REGION
0 10 20 30 40 50 60 70 80 90
PULL BOATS 3.6
ANIMALS, STEAM SKIDDERS & TRACTORS 0.0
STEAM SKIDDERS 1.4
TRACTORS 27.0
GAS SKIDDERS 3.5
ANIMALS 64.5
PINE-HARDWOOD REGION-WEST
PERCENT OF TOTAL MILLS IN REGION
0 10 20 30 40 50 60 70 80 90
PULL BOATS 0.9
ANIMALS, STEAM SKIDDERS & TRACTORS 0.0
STEAM SKIDDERS 7.3
TRACTORS 1.8
GAS SKIDDERS 0.0
ANIMALS 90.0
LEGEND
PROPORTION OF MILLS WITH A DAILY CAPACITY OF:
1-19M BD. FT
20-39M BD. FT.
40M BD. FT. & OVER

P.W.C.-4-11-37

FIGURE 7.- PRINCIPAL METHODS OF TRANSPORTING LOGS FROM WOODS TO MILLS

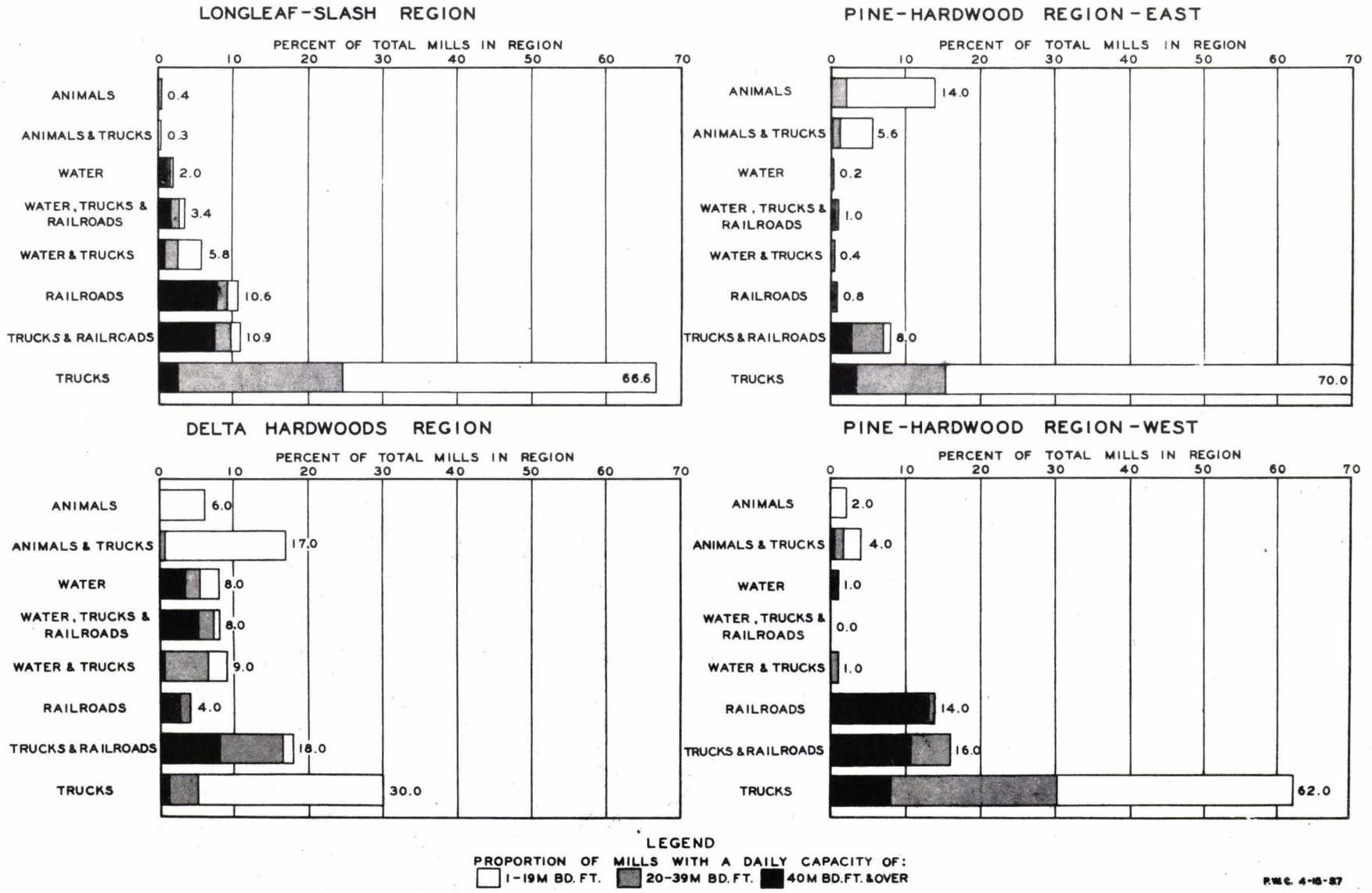


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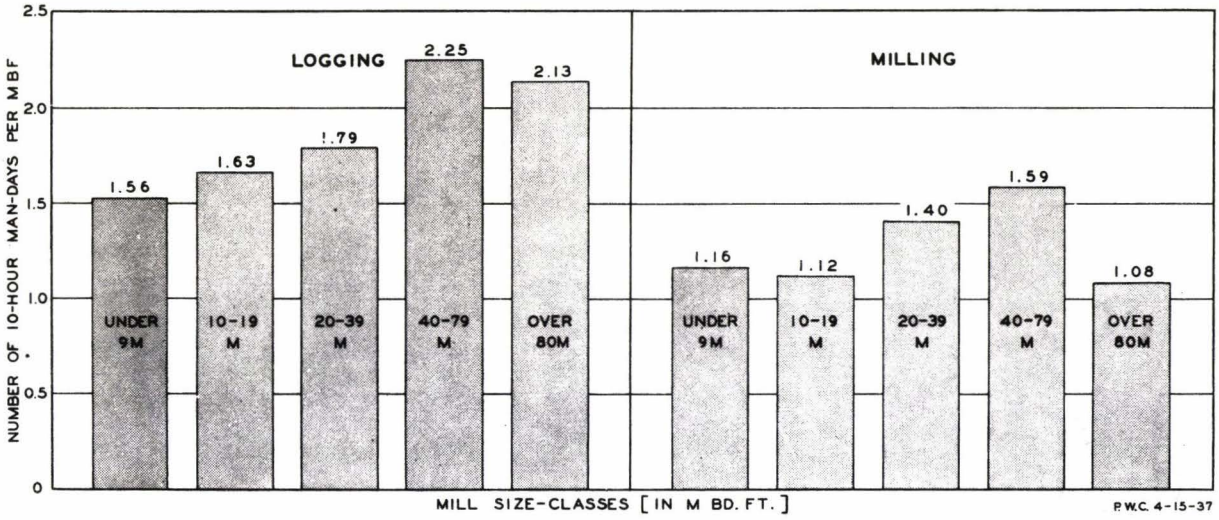
FIGURE 8.- AVERAGE LABOR REQUIREMENTS FOR LOGGING AND MILLING IN SAWMILLS OF VARIOUS SIZE-CLASSES



The information given in this release is based on data collected at a time when production of lumber was at the lowest point in several decades. Although for many years, the manufacturing and logging practices had remained of the conventional type and undergone little change, since the completion of the survey, the demand for lumber has increased, bringing about an expansion in operating capital which has consequently encouraged the introduction of more modern and efficient logging and manufacturing methods. Another generally accepted fact is that the heyday of the large mill in the lower South is past, and that the small mill is becoming an increasingly important factor in lumber production. Other pronounced changes that are occurring are the progressively diminishing use of steam skidders and logging railroads and the replacement thereof by gas skidders, tractors, and motor trucks. These trends and changes in logging and manufacturing processes and in the number and size of mills can be noted, with any degree of accuracy, only by resurveys at regular intervals.